CROP TALK

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Table of Contents

1. Forages Need Fertilizer Too!
2. Ohhh K! Potash Considerations for Corn This Fall and Next Spring
3. Another Record Wheat Crop?
4. Less White Mould In Soybeans Than Expected
5. Identifying Corn Ear Insects
6. Silage Fermentation Problems
7. Budgeting and Measuring Pasture Production
8. Comparing Organic Amendments
9. Farm Maps Made Easy

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Forages Need Fertilizer Too!

Keith Reid, Soil Fertility Specialist, OMAFRA

Too often, forages are the forgotten crops in the rotation. They pretty much get left to fend for themselves, while the annual crops receive the bulk of the attention. This is a serious mistake for anyone who depends on forages to feed their livestock or to sell as a cash crop. Profitable, high yielding and high quality forage crops only happen with a high level of management, which includes paying close attention to the nutrient requirements of the crop. This provides an immediate return in forage yield, and also maintains nutrient levels in the soil for the next crops in the rotation.

Forage crops with a high legume content will produce their own nitrogen, but they cannot generate phosphorus or potash out of thin air. Alfalfa has a reputation for needing a lot of potassium, but Figure 1 shows that yield responses to phosphorus can be very large in low P soils. An extra 5 tonnes per hectare (2 tons per acre) of forage is like getting an extra cut without having to make the extra trip over the field.

Figure 1: Forage Yield Response to Recommended P Fertilizer Rates

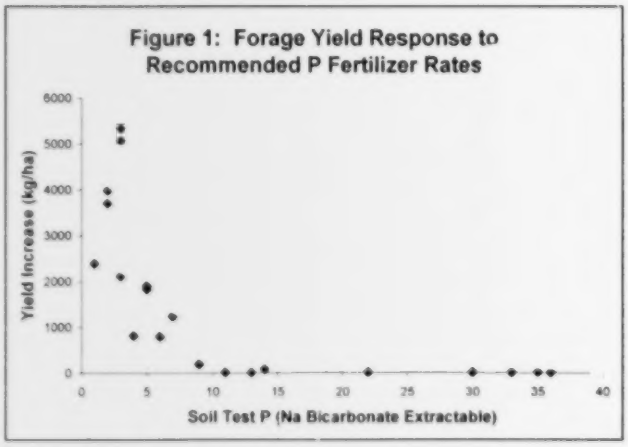

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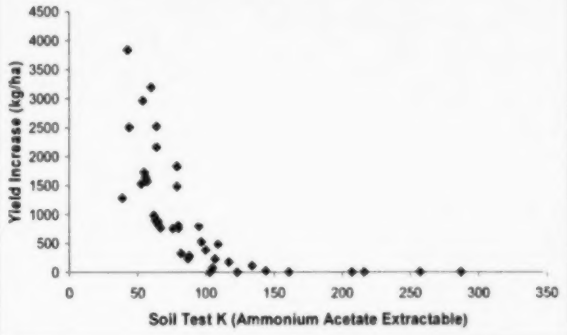
Figure 2 shows the response of alfalfa to potassium fertilizer applications, and there are also significant yield increases. We notice these yield responses more often with K because there are more fields with low soil test K than low soil test P – at least, low enough to show the big responses.

Figure 2: Forage Yield Response to Recommended K Fertilizer Rates



Note for both, however, that there is no extra yield from applying fertilizer once the soil test has been built up to high levels. You can justify fertilizer applications to replace the nutrients removed by the crop, to prevent future nutrient deficiencies, but don't expect extra yield from that maintenance application.

Ohhh K! Potash Considerations For Corn This Fall and Next Spring

Greg Stewart, Corn Specialist, OMAFRA & Ken Janovicek, University of Guelph

Your 60 bushel bean crop this year may have removed 84 lbs per acre of potash (K_2O) from the soil (1.4 lb/bu). If you grew 40 bushel beans on the same field last year, that would add another 56 lbs of potash removed per acre. Now, in terms of soil test potassium (K) values, that combined 140 lbs of removal can cause a downward movement to the tune of 8 ppm over the two years. (Significantly more on sandy ground and perhaps less on clay.) If your K soil test was already at 138 ppm, this probably means very little to you. However, if your soil test level three years ago was 90 ppm and is now 78 - read on!

Yes, potassium, the Rodney Dangerfield of nutrients (no respect), may be at play more than you might expect, depending on where your K soil test levels have fallen to over the past decade. There are some obvious reasons why we might expect K soil test values to have slipped, including the high price for potash in the recent past.

Research Trials

As usual we didn't set out to study potassium, as we were more interested in N and P effects. However, as we looked for responsive sites that had lower P soil test levels, we naturally found some fields that were relatively low for K as well.

Some of the research trial results are illustrated in Table 1 - Impact Of Starter Fertilizers On Corn Yields. The conclusions are not overly complicated or surprising. When soil test levels for K were down in the 60-80 ppm range, starter fertilizers with some K generally outperformed starters without K. This was evident at the Elora sites, even though we tried to address the low K levels by broadcasting 200 lbs/ac of 0-0-60. In some cases, you could go as far to say that the starter N and P investment was wasted if you didn't deal with the low K values.

So What?

To start with, if you do not have any fields under 121 ppm soil test K, the implications are obviously different. Potassium does behave differently than N or P. Research has generally supported the idea that even when soil test levels are high, corn yields can be boosted with a relatively small amount of N and P placed close to the seed (i.e. in furrow or 2x2). K does not generally behave this way, so this article should not make you go out and include K in your starter if soil test K levels are already high.

If you have K soil tests in the 120 to 80 ppm range, the OMAFRA recommendations are to apply 30 to 50 kg/ha K_20 respectively. You probably need to pay attention to these fields so that soil test levels do not slip further. However, these results do not deal with the question of starter versus broadcast K for soil tests in this range. The best recommendation is to apply the potash in the most cost effective manner for your farming operation.

If you have K soil test levels down in the 60-80 ppm range, the OMAFRA recommendation is to apply 80 kg/ha K_20 (117 lbs/ac of 0-0-60). These results suggest that this potassium application may be quite critical to corn yield. In some of your lowest testing soils, K in the starter next spring may add to yields even when a broadcast application of K is performed this fall.

Two final comments! Please don't expect yield responses as dramatic as some of those reported here. We may never duplicate them in the 30 years of plot work we've got left in us. Secondly, if you are not sure what your soil test levels are for P and K, make that job a priority this fall!

Acknowledgements

This research was made possible through the support of the Grain Farmers of Ontario, Innovative Farmers Association of Ontario, the Ontario Research and Development Program, OMAFRA and the University of Guelph.

Table 1. The impact of starter fertilizers on corn yields in 2008 and 2009

Site	Elora 2008	Elora 2009	Alma 2009	Bornholm 2009
Soil Test Values (ppm)	P:11 K:61	P:8 K:68	P:35 K:77	P:18 K: 80
Starter Fertilizer Treatments	**Corn Yields (bu/ac)**			
Control (no starter)	188	168	179	125
10-34-0 @ 5 gal/ac (in furrow)	195	169	180	116
11-52-0 @ 75 lb/ac (2x2)	198	165	180	114
11-52-0 @ 75 lb/ac + UAN @ 10 gal/ac (2x2)	199	163	171	114
6-24-6 @ 5.0 gal/ac (in furrow)	204	177	181	128
5-20-20 @ 200 lb/ac (2x2)	220	184	183	150

Note: At both Elora 2008 and Elora 2009, 200 lbs/acre of 0-0-60 was broadcast in addition to starter treatments.

Another Record Wheat Crop?

Peter Johnson, Cereal Specialist, OMAFRA

INCREDIBLE! With excellent wheat prices and an early soybean harvest already getting underway, wheat plantings appear ready to challenge the previous record of 1.2 million acres. Seed supplies look tight on some of the hot new varieties, with a few production issues making seed supplies even tighter. Variety selection is one of the cornerstones of big yield, so be sure to visit the Winter Wheat Performance Trials at www.gocereals.ca. There are lots of exciting new varieties. As well as the yield tables, be sure to also look at the trait tables, with particular attention to Fusarium ratings and lodging scores.

Soft Red Varieties

25R47 continues to be the variety to beat in the main production region, but a look at the trials will show that Emmit is the star performer as you move deep into Area II. Both of these varieties are proven performers, and need no further discussion.

The range of yields within the trials is closing nicely, with many varieties now challenging these old standards. 25R39 looks to have the edge in yield potential, but standability is a concern, with grower reports of "tough to combine", and a very tight seed supply. There is a big group of varieties after that, with Branson, R045, CM614, 25R56 and HY116-SRW all having a fit somewhere. Any of these varieties would be worth a trial run in your test plot, or test acreage on your farm.

Soft White Varieties

Ava continues to dominate. High yield, coupled with a MR (moderately resistant) fusarium rating make it tough competition. However, Ava does have lodging concerns, so watch nitrogen rates. There are other soft whites to consider, but often high yield matches HS (highly susceptible) fusarium ratings, a trade off I don't like.

Hard Red Varieties

Wentworth is the yield leader, but again couples with a HS fusarium rating. That makes Princeton a top option, tying together fair yield with decent fusarium (MS moderately susceptible) and reasonable standability. AC Morley and Keldin are other options.

Which Class To Grow?

Many growers are taking notice of pricing premiums to soft white or hard red classes. Consider the following in your profit calculations:

- Soft white wheat yield is equal to soft red, but has sprouting potential. Look closely at the premium offered. Does it cover increased drying fees to allow early harvest to prevent sprouting? What happens if the wheat is downgraded because of sprouting?
- Hard red wheat yield is about 8% less than soft reds. Protein premiums, if offered, are often hard to achieve. Nitrogen rates should be a minimum of 120 lbs/acre. Seeding rates may need to be higher, because many of the varieties in this class are large seeded.

Whatever class you decide to grow, remember one caveat - no more soft white than you can combine in 2 days! Good luck, and plant LOTS OF WHEAT!!!!!

Less White Mould In Soybeans Than Expected

Horst Bohner, Soybean Specialist, OMAFRA
Albert Tenuta, Plant Pathologist, OMAFRA

White mould is one of the most serious soybean diseases in Ontario. Heavy disease pressure causes significant yield loss. A wet growing season with lush crop growth usually increases the amount of disease. Fortunately, the level of disease in 2010 was less than feared, considering the amount of moisture and plant growth. In many fields the disease began to infect individual plants early in the flowering process, but for the most part did not spread further. (Photo 1 & 2) As a result, large infected areas were rare and subsequently yield losses were minimal.

There are two primary reasons for this lack of expected infection in 2010:

1. **Warm temperatures**
   White mould prefers wet conditions along with moderate temperatures (15-23°C). Despite the humid weather, the frequent daytime temperatures in the upper 20°C's and lower 30°C's during flowering reduced the infection risk, as well as the potential spread of the disease.

2. **Earlier Flowering**
   Soybeans flowered earlier than usual and matured a week or two earlier. Field experience has shown that early-maturing soybeans are less prone to an epidemic compared to longer season soybeans.

Photo 1. Plant death due to Sclerotinia sclerotiorum (white mould)

Photo 2. White cottony mycelium caused by white mould

Increased Risk of Future Infections?

The low level of disease this year does not mean that fields are free from future potential of major outbreaks. Sclerotia (the over-wintering bodies of white mould) are viable for many years, so fields with a history of white mould are at future risk. Environmental conditions are critical to the disease. Even small changes can have a big positive or negative impact, as witnessed in 2009 and 2010. Therefore, it is important to note fields with white mouldand other diseases now in order to make good management decisions for future years.

No Quick Fix

There is no quick fix for white mould. It's an extremely virulent disease. Foliar fungicides are not recommended to control white mould in soybeans. Unlike edible beans, soybeans flower over a long period of time. They would need to be sprayed two or even three times for season long protection. Also, soybeans have a relatively thick canopy, so spray penetration is difficult. Foliar fungicides have provided very inconsistent results in soybeans to date, but new products are under evaluation.

Management Strategies

1. **Crop Rotation**
   Most of the sclerotia in the top 2.5 cm (1 inch) of soil will germinate the year after they are deposited. The longer the field is not grown to susceptible crops, the less inoculum there will be. Corn and wheat do not get white mould. In fields with significant white mould pressure this year, serious consideration should be given to planting winter wheat this fall. Planting the wheat no-till will also leave more of the sclerotia on the surface so they can breakdown before another susceptible crop is grown. Edible beans, canola, and sunflowers can all get white mould and should not follow or be planted prior to soybeans.

2. **Avoid Susceptible Varieties**
   Varieties differ in their susceptibility to white mould, although there are no resistant varieties. If the field has had white mould in the past few years, a highly susceptible variety should not be grown. Most varieties have a white mould rating, or ask your seed provider for this information.

3. **Earlier Varieties**
   Planting early varieties can reduce the amount of disease. For fields with a severe history of white mould, plant varieties that are 200 – 300 CHU shorter than your area. Varieties that are less prone to lodging also tend to get less white mould.

4. **Wider Row Widths**
   Planting to wider rows with lower plant populations will also minimize disease damage. Although wider rows and lower seeding rates will give up some yield in years when no white mould develops, this strategy can reduce white mould severity during wetter, cooler summers. Grow fields prone to mould with a minimum row width of 38 cm (15 inches) at 150,000 seeds/acre. Consider using 76 cm (30 inch) rows in fields with a history of white mould.

Seed should not be kept from heavily infected fields. This can spread the disease. With these strategies in mind, white mould can be kept in check and does not need to cause significant yield losses in future years.

Identifying Corn Ear Insects

Tracey Baute, Field Crop Entomologist, OMAFRA-Ridgetown

While scouting your corn fields this fall, you may come across a few corn ear insects, especially western bean cutworm. Even the best of scouts can sometimes find themselves confused as to which corn insect they are looking at. Here is a guide that should help you identify the 4 most common insects that you will come across in your corn ears this year.

Figure 1. Corn earworm larva. (Photo Credit: University of Illinois)

Corn Earworm (CEW)

Key CEW Features:

- orange-brown head with veins or freckles on the face
- vary in colour from green to pink to brown
- alternating dark and light stripes
- spines or hairs sticking out of skin
- tubercles or warts evident along side of body
- no broad bands behind the head (see Figure 2)

Figure 2. Western bean cutworm (WBC) versus Corn earworm (CEW) heads. Note the two broad bands behind the WBC head and the warts on the CEW. (Photo Credit: Marlin Rice)

European Corn Borer (ECB)

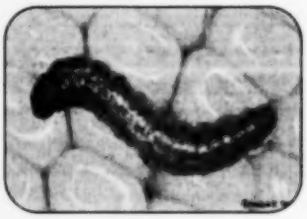


Figure 3. European corn borer larva (Photo Credit: Marlin Rice)

Key ECB Features:

- black or dark brown head
- spots running along body
- no stripes along body
- tunnels through shank and cob and surface feeds on the kernels

Fall Armyworm

Figure 4. Fall armyworm larva (Photo Credit: T. Baute, OMAFRA)

Key FAW Features:

- black head with white inverted Y on face
- hairy spines along body
- stripes running length of body

Western Bean Cutworm (WBC)

Figure 5. Full Grown WBC larva. Note the broad bands behind head. (Photo Credit: T. Baute, OMAFRA)

Key WBC Features:

- orange-brown head
- older larvae have two broad brown bands or rectangles behind head
- face sometimes has small arrows or chevrons
- sometimes has wide dark band running along body, just above the legs
- younger instars have stripes along body but lose these in the last instars (Figure 6)
- younger instars lack the two broad bands behind head

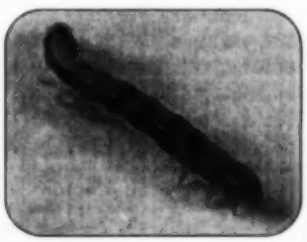


Figure 6. Younger WBC larva. Note the stripes along the body and lack of the two broad bands behind head (Photo Credit: T. Baute, OMAFRA)

Silage Fermentation Problems

Joel Bagg, Forage Specialist, OMAFRA

When we make corn silage and haylage, we are using our skills as microbiologists, just like winemakers, brewers and composters. As a biological system, silage making doesn't always work perfectly. During an anaerobic silage fermentation, microorganisms feed on sugars and other soluble carbohydrates in the forage material and produce organic acids, such as lactate and acetate. This lowers the pH and creates an environment where the resulting silage is preserved. We sometimes have less success making silage, because of management, the weather and what we have to work with.

An efficient fermentation is desirable for 2 reasons:

- to preserve nutrients to optimize livestock intake and performance, and
- to minimize forage dry matter lost in the fermentation process and spoilage at feedout. Fermentation losses can be 12 - 15% with a good fermentation, and much higher with a poor one. Spoilage losses can be significant.

We know what we have to do to make good silage - cut at the right maturity and moisture, chop at the right length, use inoculants strategically, keep it anaerobic (without oxygen) by filling the silo quickly, adequate packing, covering and sealing it well and right away, face management, etc, etc. However, sometimes things don't go well and we end up with high fermentation losses, poor nutrient quality and palatability, and silage that wants to spoil easily. It can be useful to determine what went wrong and know how to avoid that the next time.

Common Fermentation Problems

When we encounter problem silage, it is usually the result of incorrect moisture or the presence of oxygen. Odours can be good indicators. Here are a few problems that we might smell and what might have caused it.

1. Rancid, Fishy Odour

This is butyric acid resulting from clostridia contamination from soil. Clostridia silage can result from cutting or raking too close to the ground, soil from packing tractor tires, "splash" from rain, or manure applied too late after the previous cutting. Butyric acid also commonly results from silage that is too wet (> 70% moisture). As well as its foul odour, this silage sometimes has a slimey, sticky texture. Haylage can clump into characteristic "butryic balls". Fermentation losses of non-structural carbohydrates are high, so ADF levels are high. Protein is degraded. Palatability, intake, and digestible energy are low, and livestock performance is poor. We saw lots of this in 2008, when we struggled to get haylage made between frequent rains.

2. Mouldy With A Musty Odour

Mouldy silage results in high dry matter losses, as well as poor palatability and livestock performance. This spoilage is the result of aerobic (oxygen) conditions from poor packing, slow filling, low moistures, poor sealing, slow feedout, or poor face management. If the silage is still hot, microbial activity and spoilage is still underway.

3. Vinegar Odour

Acetic acid is more commonly known as vinegar. Lactic acid is the most desirable product of fermentation because it is produced most efficiently, with the least dry matter losses. Too much acetic acid relative to lactic acid means the fermentation was less than optimally efficient, and possibly could have benefited from a commercial lactic acid bacteria (LAB) inoculant.

4. Sweet Odour

This smell is likely high concentrations of ethanol produced by spoilage yeasts, mixed with acetic acid. Fermentation losses were likely high and this silage will be prone to heating and spoiling in the bunk. Desirable lactic acid has little smell.

5. Ammonia Odour

This indicates excessive protein breakdown to ammonia and amines, which could be due to a clostridia fermentation or high pH.

6. Carmelized Odour

This heat damaged haylage is dark in colour with a tobacco odour. In severe cases it can smell burnt, indicating excessive heating. Heat-damaged silage is the result of forage that is too dry. Protein becomes bound and is less digestible. ADF-N (unavailable nitrogen) can be measured in a laboratory.

Fermentation Analysis

A newer technology available in silage problem-solving is fermentation analysis. It enables us to objectively quantify what we subjectively see and smell. This can be especially useful when poor livestock performance cannot be explained by nutrient analysis. Fermentation analysis is available in Ontario from Agri-Food Laboratories, and some U.S. labs. Typical fermentation end product concentrations are listed in Table 2.

1. High pH

A high pH indicates a poor or restricted fermentation that will be less stable and result in poor bunk life and more spoilage at feeding. Legume haylage has a higher buffering capacity than grass haylage and corn silage, and quite often has a higher pH.

2. Low Lactic Acid

Lactic acid should make up over 65-70% of the total silage acids, with a lactic/acetic acid ratio of at least 3:1. Lactic

acid is the most effective in lowering pH, and is what we are trying to improve by using a commercial LAB inoculant.

Table 2 – Typical Levels of Silage Fermentation End-Products

	Corn Silage	Legume Haylage >65% moisture	Legume Haylage <55% moisture	Grass Haylage
pH	3.7 – 4.2	4.3 – 4.5	4.7 – 5.0	4.3 – 4.7
lactic acid %	4 – 7	7 – 8	2 – 4	6 – 10
acetic acid %	1 - 3	2 – 3	0.5 – 2.0	1 – 3
propionic acid %	< 0.1	< 0.5	< 0.1	< 0.1
butyric acid %	0	< 0.5	0	0.5 – 1.0
ethanol %	1 – 3	0.5 – 1.0	0.5	0.5 – 1.0
ammonia-N (% of CP)	5 - 7	10 – 15	< 12	8 - 12

Source - Dr Limin Kung, University of Delaware

3. High Acetic Acid

Acetic acid levels greater than 3 – 4% can result from poor fermentations, especially if lactic acid levels are significantly low. Buchneri inoculants are sometimes added to corn silage and high moisture corn to produce acetic acid late in the fermentation to improve bunk life. Don't mistake this for a poor fermentation.

4. High Ethanol

High ethanol indicates yeast that reduces dry matter recovery and makes the silage more prone to mould and feedout spoilage. Off-flavours in milk can also sometimes result.

5. High Ammonia-N

This indicates excessive protein breakdown and possibly excess ruminally-degraded protein. Levels greater than 12 – 15% can be a problem for the dairy nutritionist.

6. Butyric Acid

This is the bad one! If it it accompanied by high percent moisture and/or high ash content, then that confirms what management issue needs to be corrected. In the silo, butyric acid results in high losses of dry matter and digestible energy. In the ruminant it results in poor intakes and metabolic problems. If possible, silage high in butyric acid should be discarded. Dr Gary Oetzel, University of Wisconsin, recommends the following butyric acid daily limits to prevent off-feed and ketosis in dairy cows:

- fresh cows - < 50 grams
- early lactation - <150 grams
- all other lactating cows - < 250 grams.

Diagnostic Tools

Whatever the results of your fermentation analysis, the reality is that you're likely stuck with the silage you have for the year. But, using what you see and smell, combined with a fermentation analysis as a diagnostic tool can help in identifying what can be improved in your silage making in the years ahead.

For more information on silage making, refer to the OMAFRA Forage Website www.omafra.gov.on.ca/english/crops/field/forages.html#storage.

Budgeting and Measuring Pasture Production

Jack Kyle, Grazing Specialist, OMAFRA

Pasture is a feeding system. Like any feeding system it is important to know the needs of your livestock and the amount of feed you are offering. Think of your pasture field as a feed bunk. When feeding in a bunk or manger you offer your livestock the quantity of feed they need to get to the next feeding while maintaining feed quality at the highest possible level. Estimating the pounds of feed on a pasture may seem like a tall task, but it is important if you are going to achieve the potential of the pasture and livestock.

There are two steps to this process:

1. determine the nutritional needs of your livestock, and
2. determine how much forage is available for grazing each day.

Step 1 – Determine Livestock Requirements

The nutritional needs of livestock are generally calculated in terms of dry matter (DM). Dry matter intake of 3% of body weight is frequently used for growing and producing livestock. A 1,200 lb cow requires 36 lbs of DM per day (1,200 × 0.03), and a 1,500 lb cow requires 45 lbs of DM per day (1,500 × 0.03). This may be slightly more than their actual needs, but it allows for some feed refusal. If we take the total weight of the herd multiplied by 3% we get the feed required per day on pasture.

Step 2 – Determine Pasture Available

The second step is to determine how much grass or forage is available on a given area for the livestock to graze. This can be done by one of 3 methods:

1. Grazing Stick

A grazing stick enables you to measure the height and density of the grass by how visible the stick is on the ground. Using a table of height and density printed on the stick, you can estimate the forage DM available.

2. Rising Plate Meter

An 18 inch square plexiglass plate 1/8th inch thick is used to slightly compress the grass to a constant density. The height of the compressed grass is measured and a chart is used to estimate the DM available per acre.

When calculating the amount of forage in the field, remember that you want to leave 3-4 inches of residue to re-grow and start the development of the grass for the next grazing cycle. Subtract this 3 or 4 inch height from the total height to get the usable height.

3. Sample & Weigh

A more accurate method is to harvest 2 or 3 square feet of grass, weigh the amount harvested and dry a representative sample to determine the amount of DM. (Note - 2 sq ft is 1'-5" × 1'-5".) You should sample several areas of the pasture to get a representative value. The sample can be dried in a microwave oven. Weigh a sample of approximately 100 grams and microwave for a couple of minutes. Re-weigh, microwave again for a minute and weigh again. Repeat this procedure until the weight does not change. Put a cup of water in the corner of the microwave to avoid damaging the microwave. Percent DM is determined by dividing the dry weight by the wet weight multiplied by 100.

For example, with a wet weight of 100 grams, and dry weight 20 grams, the DM will be 20% (20/100 × 100). If the weight from two square feet is 200 grams and the DM is 20%, then there is 20 grams of dry matter per square foot (200 × 0.2 ÷ 2). An acre (43,560 square feet) would have 871 kg of forage available for grazing (0.02 kg/square foot × 43,560 square feet). If we multiply this number by 2.2, the 871 kg is converted to 1,916 lbs.

Calculating Head / Acre / Day

If the grass you measured indicated that there was 1,916 lbs of DM available for grazing, then this would support 63,873 lbs of animal per acre (1,916 ÷ 0.03). For every 63,873 lbs of animal you need to offer one acre of pasture for each day that they are going to be in the pasture. Ideally this will be one day, and should not be more than 5 days because intake will drop. The best grass is eaten the first day, and by the fourth or fifth day the pasture is pretty well picked over. This is very important for stocker cattle where you are looking for good gains, because you want to have them eating the maximum amount of forage each day. Stocker cattle that are moved to fresh pasture every one or two days throughout the grazing season should gain 300 lbs in a 5 month grazing season.

Knowing how much forage and dry matter that you are offering to your pasture animals will allow you to get maximum performance from both the livestock and the pastures.

Comparing Organic Amendments

Christine Brown, Nutrient Management Specialist, OMAFRA

Which is the priority on your amendment wish-list - organic matter, nitrogen, phosphorus? Does it matter if potash levels in the material are low? Would the addition of calcium be beneficial?

Cash crop producers have some of the same opportunities for applying organic amendments to their fields as their livestock producer neighbours. But with many different non-agricultural sourced materials on the market, it is important to know which product has the best fit to meet the needs of the fields to which the material will be applied.

Value of Organic Matter

It is relatively easy to determine the fertilizer equivalent value of each material, but determining the dollar value of the organic matter (OM) is more difficult. Organic matter represents up to 68%, or more than 1,300 lbs/ton in some of these materials. Organic matter benefits include:

- feeds the micro organism populations, improving diversity,
- increases the nutrient-holding capacity of the soil (especially sand and clay),
- increases the water-holding capacity of the soil (especially sand and clay), and
- increases soil structure and aggregate stability and helps prevent soil erosion.

Middlesex SCIA Demonstration

Recently the Middlesex Soil & Crop Improvement Association demonstrated the application of three different materials – 1. processed biosolids pellets, 2. N-viro, and 3. municipal green bin compost. Each product could be applied without requiring a nutrient management plan as they are regulated under the Canadian Fertlizers Act or are classified as an unrestricted compost.. Each product had some unique characteristics that made it a good fit for some specific conditions. Samples of each material were taken for analysis so that each could be easily compared. The macro and micro nutrients that they would provide (in lbs/ton as applied) is shown in Table 3, as well as organic matter additions, pH, bulk density and C:N ratio.

Processed biosolids pellets are an excellent source of organic matter, nitrogen, phosphorus and micronutrients, but are not the product of choice if potash is an important requirement. This product would not be a good choice for fields with low potassium fertility, or alfalfa forages with an aggressive harvest schedule, unless the field was supplemented with potash (KCl). Processed biosolids are available from Windsor and Toronto and are similar in content The processes used at the water treatment plants do result in some differences in aluminum, calcium, iron levels that could affect phosphorus availability, especially in low pH soils.

Table 3. Amendment Material Analysis (Middlesex S&CIA) Tour

		Biosolids Pellets (Windsor)	Biosolids Pellets (Toronto)	N-Viro (Sarnia)	Municipal Greenbin Compost (London)
Dry Matter (DM)	%	94.8	95.1	77.0	77.0
pH		6.3	6.8	12.6	6.9
Bulk Density	kg/m^3	588	795	836	316
Bulk Density	lbs/ft^3	36.7	49.6	52.2	19.7
C:N Ratio		9:1	7:1	21:1	12:1
lbs per ton *(as-applied basis)*					
Total N		87	92	11.4	47
NH_4-N		3.6	1.3	0.5	5.3
Available N [1]		45	47	4	18
P_2O_5		72 [2]	91	15	19
K_2O		4	3	79	19
Calcium	Ca	32	68	322	63
Aluminium	Al	89 [2]	29	28	7
Iron	Fe	21	80	15	9
Sulphur	S	17	21	59	8
Magnesium	Mg	8	12	14	6
Manganese	Mn	1.1	0.7	0.4	0.3
Copper	Cu	0.6	2.0	0.2	0.1
Zinc	Zn	1.0	1.9	0.4	0.3
Boron	Bo	0.03	0.05	0.05	0.02
Sodium	Na	3	2	7	15
Total Salts		6	5	32	9
Organic Matter	OM	1320	1152	432	1002

[1] Available N is an estimate of available N in the year of application (fall or spring applied) – availability will vary with season of application, soil temperature and moisture conditions and C:N ratio.

[2] P205 availability could be reduced with hgh Aluminium levels when combined with low pH

N-Viro is also a biosolids material. It is processed with kiln dust to provide a liming benefit to fields. The high calcium and potassium indicate availability of liming capacity from the kiln dust, making this product ideal for sandy soils with low pH levels. Nitrogen contribution and organic matter per ton is relatively low. Planting immediately after application should be avoided, especially on dry sandy soils, since high salt content could lead to seed-burn. N-Viro should be applied on a wind-free day, because it is dusty.

Municipal green bin compost is a high organic matter product with a good balance of available N-P-K and micro nutrients. With a bulk density of about 20 lbs/cubic foot, the odour and consistency is similar to corn silage. This compost is easier to apply uniformly than most solid manure types. This type of product fits well when applied once in the rotation (i.e., after cereal harvest in the fall) at about 10 ton/acre. Hamilton, Peel, Ottawa and Th:>rold regions also have municipal green bin compost programs available or in development.

Table 4. Approximate Cost Comparison

Type	Cost/Tonne	Includes Trucking	Includes Spreading
Windsor Biosolids Pellets	$ 24	yes	$ 8 / T
N-Viro – Sarnia	$ 50	yes	yes
London Municipal Greenbin Compost	$ 12	no	no

The information in this table is based on information given at the Middlesex S&C meeting by each of the sales representatives. They are subject to change based on volume applied and distance.

Representatives:
Windsor Processed Biosolids Pellets: Harry Buurma – 519-849-5010 buurma family@gmail.com
N-Viro – Ian Shipley 519-786-2106 or Lise LeBlanc 519-410-3228 lise leblanc@n-viro.ca
London Municipal Greenbin Compost – John Killins or Travis Woollings 519-317-6756 twoollings@rogers.com

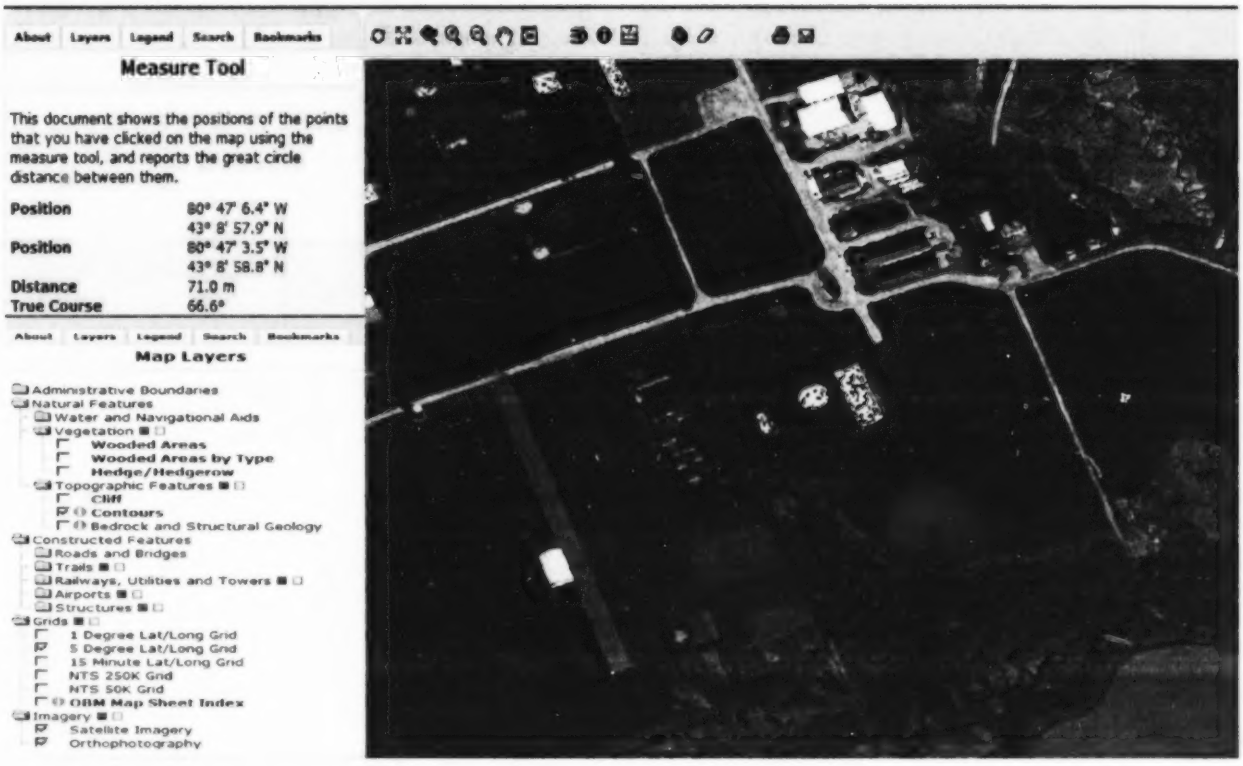
Farm Maps Made Easy

Christine Brown, Nutrient Management Specialist – Field Crops, OMAFRA

Tired of drawing maps of your fields? There is a new on-line tool available that lets you see your farmstead and fields from the air....and close up.

The Ontario Ministry of Natural Resources has a GIS website that can be used for looking at aerial views of farms or for mapping fields anywhere in the province. The mapping tool has many layers, including contours to measure slopes and tools to measure distance and assess GPS coordinates. There are too many features to list, but they are worth trying out.

The map below is from the Outdoor Farm Show site in Woodstock. It shows contour lines, distance from front to back of the OSCIA plot area, and the GPS coordinates. The site can be found at http://www.lio.ontario.ca/imf-ows/imf.jsp?site=makeamap_en or visit www.ontario.ca/mnr and click "Maps & Geographic Information".



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